

(d) You may ask to use an alternate program for testing production-line vehicles or engines. In your request, you must show us that the alternate program gives equal assurance that your products meet the requirements of this part. If we approve your alternate program, we may waive some or all of this subpart's requirements.

(e) If you certify an engine family with carryover emission data, as described in § 1051.235(c), and these equivalent engine families consistently pass the production-line testing requirements over the preceding two-year period, you may ask for a reduced testing rate for further production-line testing for that family. The minimum testing rate is one vehicle or engine per engine family. If we reduce your testing rate, we may limit our approval to a any number of model years. In determining whether to approve your request, we may consider the number of vehicles or engines that have failed the emission tests.

(f) We may ask you to make a reasonable number of production-line vehicles or engines available for a reasonable time so we can test or inspect them for compliance with the requirements of this part.

(g) The requirements of this subpart do not apply to engine families certified under the provisions of § 1051.630.

**§ 1051.305 How must I prepare and test my production-line vehicles or engines?**

(a) *Test procedures.* Test your production-line vehicles or engines using the applicable testing procedures in subpart F of this part to show you meet the emission standards in subpart B of this part.

(b) *Modifying a test vehicle or engine.* Once a vehicle or engine is selected for testing (see § 1051.310), you may adjust, repair, prepare, or modify it or check its emissions only if one of the following is true:

(1) You document the need for doing so in your procedures for assembling and inspecting all your production vehicles or engines and make the action routine for all the vehicles or engines in the engine family.

(2) This subpart otherwise specifically allows your action.

(3) We approve your action in advance.

(c) *Malfunction.* If a vehicle or engine malfunction prevents further emission testing, ask us to approve your decision to either repair it or delete it from the test sequence.

(d) *Setting adjustable parameters.* Before any test, we may adjust or require you to adjust any adjustable parameter to any setting within its physically adjustable range.

(1) We may adjust idle speed outside the physically adjustable range as needed only until the vehicle or engine has stabilized emission levels (see paragraph (e) of this section). We may ask you for information needed to establish an alternate minimum idle speed.

(2) We may make or specify adjustments within the physically adjustable range by considering their effect on emission levels, as well as how likely it is someone will make such an adjustment with in-use vehicles.

(3) We may adjust the air-fuel ratio within the adjustable range specified in § 1051.115(d).

(e) *Stabilizing emission levels.* Before you test production-line vehicles or engines, you may operate the vehicle or engine to stabilize the emission levels. Using good engineering judgment, operate your vehicles or engines in a way that represents the way they will be used. You may operate each vehicle or engine for no more than the greater of two periods:

(1) 50 hours.

(2) The number of hours you operated the emission-data vehicle used for certifying the engine family (see 40 CFR part 1065, subpart E, or the applicable regulations governing how you should prepare your test vehicle or engine).

(f) *Damage during shipment.* If shipping a vehicle or engine to a remote facility for production-line testing makes necessary an adjustment or repair, you must wait until after the after the initial emission test to do this work. We may waive this requirement if the test would be impossible or unsafe, or if it would permanently damage the vehicle or engine. Report to us, in your written report under § 1051.345, all adjustments or repairs you make on test vehicles or engines before each test.

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(g) *Retesting after invalid tests.* You may retest a vehicle or engine if you determine an emission test is invalid. Explain in your written report reasons for invalidating any test and the emission results from all tests. If you retest a vehicle or engine, you may ask us to substitute results of the new tests for the original ones. You must ask us within ten days of testing. We will generally answer within ten days after we receive your information.

**§ 1051.310 How must I select vehicles or engines for production-line testing?**

(a) Use test results from two vehicles or engines for each engine family to calculate the required sample size for the test period. Update this calculation with each test.

(1) For engine families with projected annual sales of at least 1600, the test periods are consecutive quarters (3 months). If your annual production period is less than 12 months long, define your test periods by dividing your annual production period into approximately equal segments of 70 to 125 calendar days.

(2) For engine families with projected annual sales below 1600, the test period is the whole model year.

(b) Early in each test period, randomly select and test an engine from the end of the assembly line for each engine family.

(1) In the first test period for newly certified engines, randomly select and test one more engine. Then, calculate the required sample size for the test period as described in paragraph (c) of this section.

(2) In later test periods or for engine families relying on previously submitted test data, combine the new test result with the last test result from the previous test period. Then, calculate the required sample size for the new test period as described in paragraph (c) of this section.

(c) Calculate the required sample size for each engine family. Separately calculate this figure for HC, NO<sub>x</sub> (or HC+NO<sub>x</sub>), and CO (and other regulated pollutants). The required sample size is the greater of these calculated values. Use the following equation:

$$N = \left[ \frac{(t_{95} \times \sigma)}{(x - \text{STD})} \right]^2 + 1$$

Where:

N = Required sample size for the model year.  
t<sub>95</sub> = 95% confidence coefficient, which depends on the number of tests completed, n, as specified in the table in paragraph (c)(1) of this section. It defines 95% confidence intervals for a one-tail distribution.

x = Mean of emission test results of the sample.

STD = Emission standard (or family emission limit, if applicable).

σ = Test sample standard deviation (see paragraph (c)(2) of this section).

(1) Determine the 95% confidence coefficient, t<sub>95</sub>, from the following table:

n	t <sub>95</sub>	n	t <sub>95</sub>	n	t <sub>95</sub>
2	6.31	12	1.80	22	1.72
3	2.92	13	1.78	23	1.72
4	2.35	14	1.77	24	1.71
5	2.13	15	1.76	25	1.71
6	2.02	16	1.75	26	1.71
7	1.94	17	1.75	27	1.71
8	1.90	18	1.74	28	1.70
9	1.86	19	1.73	29	1.70
10	1.83	20	1.73	30+	1.70
11	1.81	21	1.72	.....	.....

(2) Calculate the standard deviation, σ, for the test sample using the following formula:

$$\sigma = \sqrt{\frac{\sum (X_i - x)^2}{n - 1}}$$

Where:

X<sub>i</sub> = Emission test result for an individual vehicle or engine.

n = The number of tests completed in an engine family.

(d) Use final deteriorated test results to calculate the variables in the equations in paragraph (c) of this section (see § 1051.315(a)).

(e) After each new test, recalculate the required sample size using the updated mean values, standard deviations, and the appropriate 95-percent confidence coefficient.

(f) Distribute the remaining vehicle or engine tests evenly throughout the rest of the year. You may need to adjust your schedule for selecting vehicles or engines if the required sample size changes. Continue to randomly select vehicles or engines from each engine family; this may involve testing